

## NED and SIMBAD Conventions for Bibliographic Reference Coding

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### 24-1 History

The uniform 19-digit code used for bibliographic references within NED and SIMBAD was developed by both teams in consultation with Dr. H. Abt, editor of the *Astrophysical Journal*. The primary purpose of the "REF\_CODE" is to provide a unique and traceable representation of a bibliographic reference within the structure of each database. However, in many cases, the code has sufficient information to be quickly deciphered by eye, and it is used frequently in the interfaces as a succinct abbreviation of a full bibliographic reference. Since its inception, it has become a standard code not only for NED and SIMBAD, but — with minor variations -- for ADS and other bibliographic services. In addition, the acronyms for journals used as part of the code have become standards for some of the main astronomical journals in their own bibliographies.

Our main consideration in designing the REF\_CODE was to make its definition as objective as possible. This helps to avoid having the history of data entry affect the naming system; allows automatic coding to some extent; avoids confusion, conflicts, and ambiguities in its meaning; lets different individuals or teams construct REF\_CODES without having to resort to constant consultation on the details of the code; and facilitates exchange between databases (e.g. NED and SIMBAD).

### 24-2 Definition

The standard code is a string 19 characters long, a combination of fields, some numerical and some alphabetic, exactly predictable for journal articles, but

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not necessarily for books. The format is as follows, with the various fields explained below. Blank spaces within the string are replaced with Periods, and no leading zeros are allowed in volume and page numbers.

YYYYJJJJVVVVMPP1'PA

YYYY The four digits of the year of publication.

JJJJ: Code for the publication, entered left-justified within the five spaces. Five categories are distinguished:

PERIODICALS (including both regularly-published periodicals and occasional publications): these codes are acronyms based on the names (as in ApJ, A&A, PASJ, MNRAS), and are reserved for all years. The codes for the journals that NED presently scans directly are given in Table 24-1. Codes for journals currently scanned for the SIMBAD bibliography are given in Table 24-2, and a sample of codes for less-frequently encountered journals are given in Table 24-3. A complete listing of these tables is available on the World-Wide Web at [-1] and [-2].

CATALOGS: these codes are generally built from "standard" abbreviations of the catalogs' names. Examples are UGC, ESO, RSA, and RC3. If the catalog is a multi-volume work, the volume number is inserted in the Volume field (see below). The codes for some often-used extragalactic catalogs are listed in Table 24-4.

BOOKS (by which we mean all other monograph-length Publications): the codes in this category are constructed in essentially the same way as those for Periodicals and catalogs, from some or all of the initials (or following letters) of the title. While there is clearly some freedom in assigning codes to books, it is not necessary for the user to be able to identify a random book from its reference code (the database interface does the decoding as needed). Note also that the same code combined with a different year points to a different book.

THESES (primarily doctoral theses, but occasionally includes masters theses): these codes are acronyms based on the name of the university granting the degree (see Table 24-5 for examples; the complete list is available on-line). For theses, the volume number field ("VVVV" below) contains ". TOO". in the case of duplicate author initials, the ". TOO" becomes ". 1'01", ". T02", etc.

UNPUBLISHED: this, unfortunately, is unavoidable as a category. If the reference is to a collection of data never described in print, then this field will contain the code "UNPUB". Private communications to NED or SIMBAD carry the code "Private".

VVVV: Volume number, right-justified, if the reference is to a periodical; otherwise, the second character in this field is a letter that serves as a classification flag. The following flags and classes of books are presently identified:

- B textbook
- C catalog
- M digitized version (magnetic tape, CD-ROM, etc.)
- I' preprint
- R report or conference proceedings
- T thesis
- U unpublished

For multi-volume books, catalogs, and reports, the volume number is given in the last two digits.

M: This field is intended to break any remaining ambiguity after volume number, page number, and author's initial have been specified. It is used only when necessary, as in the following two classes of problems:

One class of ambiguities results when there are two or more independent page sequences within the same volume number, in which case the following codes are reserved for this field:

- l. Letters sections in various journals.
- p Pink pages in *MNRAS*.
- a, b, . . . , z Issue numbers within the same volume, each of which starts with page 1 (e.g. *Physics Today*).
- A, B, . . . . K Issue designations used by publisher within same volume, where each issue starts with page 1.

Another class of ambiguities results when there are two or more articles on the same page, as in *Nature*. Such articles starting on the same page are numbered sequentially in their order of appearance, and a code corresponding to this order is inserted in this field. In that case, the code has values

Q, J, {, . . . , Z First, second, . . . , tenth article on the page.

For Theses, this field contains the author's first initial.

1'1'1'1': Page number of reference, or ". . .0" when the whole book is referenced. This field contains the page numbers, which are right-justified within the four spaces available, preceded by periods to fill empty spaces.

A: This field contains the first letter of the first author's last name. This provides some redundancy in the code which might be useful in tracking down errors. If the first author cannot be identified, or no authorship

is expressed, a colon (:) appears in this field. When the REF.CODE as a whole does not follow the standard rules described above (which might happen for books) a percent sign (%) is inserted in this field. This field is case sensitive.

Here are some examples to illustrate the use Of the reference code:

- |                              |  |
|------------------------------|--|
| 1983 ARA&A .21. .177S        | Stein and Soifer. 1983, <i>Ann. Rev. Astron. Astrophys.</i> , 21, 177.   |
| 1988ApJ . .324. .767W        | Ward <i>et al.</i> 1988, <i>Astrophys. J.</i> , 324, 767.  |
| 1988 ApJS . .66. .183J       | Jura. 1988, <i>Astrophys. J. Suppl.</i> , 66, 183.   |
| 1988PASP . .100. .625S       | Sandage. 1988, <i>Publ. Astron. Soc. Pacific</i> , 100, 625.   |
| 1988 Natur .331.6157B        | Bergvall. 1988, <i>Nature</i> , 331, 6157.   |
| 1976ApJS . .31 . .187D       | Dressel and Condon. 1976, <i>Astrophys. J. Suppl.</i> , 31, 187.   |
| 1978IAUC.3305 . . . .1K      | Kowal, I.o, and Sargent. 1978, <i>IAU Circ. No.</i> 3305.  |
| 1988A&A . . . .206L . .23M   | Maugorodato <i>et al.</i> 1988, <i>Astron. Astrophys.</i> , 206, 1.23.   |
| 1984IRSD . .R. . . .118G     | Gatley. 1984, in <i>Lab. and Obs. IR Spectra of IS Dust</i> , proc. of the Hilo Workshop, July 1983, ed. Wolstencroft and Greenberg, p. 118. |
| 1909UCB . . . .T00E . . . .F | Fath, E. A. 1909, <i>The Spectra of Some Spiral Nebulae and Globular Star Clusters</i> , thesis, Univ. of Calif., Berkeley.                  |

### 24-3 Conclusions

The Bibliographic Reference Code is a domain-specific code which was designed to be sufficient for the immediate needs of astronomy in uniquely, succinctly, and informatively identifying bibliographic references. Nevertheless, the REF.CODE proved to be general enough to encompass most of the existing astronomical literature. But these REF. CODES were not explicitly designed to be so general that they were guaranteed to automatically encompass all presently available media, nor do they necessarily fully anticipate future directions in publishing.

In combination with a descriptive reference database, the cryptic form of the REF.CODE can be (and is) attached to a more extensible information listing. For instance, while the REF.CODE carries only the first page number of a reference, the Reference 1 Database carries the first and last page numbers of the article. Obviously, the same qualifications apply to titles and authors which are highly abbreviated in the REF. CODE, but more fully represented in

the Database.

The same principles could be used to fully link a REF. CODE to data cubes, CD-ROMs, external databases, animations, simulations, time---tagged data, *etc.* While the Reference Code is compact, it is not yet saturated; there are still fields with room for added pointers to the new directions that the publishing of astronomical data may take in the immediate future.

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## Access Pointers

[→1] <http://www.ipac.caltech.edu/NED/refcode.html>

[→2] <http://cdsweb.u-strasbg.fr/simbad/refcode.html>

REF_CODE	Title
A&A..	Astron. Astrophys.
A&AS.	Astron. Astrophys., Suppl. Ser.
Afz..	Astrofizika
AJ...	Astron.J.
ApJ..	Astrophys.J.
ApJS.	Astrophys. J., Suppl.Ser.
AREP.	Astronomy Reports (formerly Soviet Astronomy)
AstL.	Astronomy Letters (formerly Soviet Astronomy Letters)
IAUC.	IAU Circulars.
MNRAS	Monthly Notices of the Royal Astronomical Society
Natur	Nature
PASJ .	<b>Publ.</b> Astron. Soc. Jap.
PASP .	Publ. Astron. Soc. Pac.
SVA . .	Soviet Astronomy (now Astronomy Reports)
SVAL .	Soviet Astronomy letters (now Astronomy Letters)

Table 24-1: NEDCore Journal Acronyms

REF_CODE	Title
A&A..	Astronomy & Astrophysics
A&AS.	Astronomy & Astrophysics Suppl. Ser.
A&ARv	Astronomy and Astrophysics Review
AcA..	Ada Astronomic
AcASn	Ada Astronomic Sinica
AcApS	Acts Astrophysica Sinica
ACiCh	Astronomical Circular (Nankin)
Afz..	Astrofizika
AGAb.	Astron. Gesellschaft Abstract Ser.
AISof	Astrophysical Investigations - Sofia
AJ...	Astronomical Journal
AN...	Astronomische Nachrichten
APh..	Astroparticle Physics
ApJ. .	Astrophysical journal
ApJS.	Astrophys. J. Suppl. Ser.
ApL..	Astrophysical Letters and communications
Ap&SS	Astrophys.& Space Science
Aster	Aster
Ast..	Astronomy
ATsir	Astron. Tsirk.
AuJPh	Australian J. Phys.
AZh..	Astronomicheskij Zhurnal
BAAS.	Bull. American Astron. Sot.
BaltA	Baltic Astronomy
BCFHT	Bull. CFHT
BICDS	Bull. Inf. Centre Données Strasbourg
BOBeo	Bull. Obs. Astron. Beograd
C&E..	Ciel et Espace
ChA&A	Chinese Astron. & Astrophys
C&T..	Ciel et Terre
ComAp	Comments on Astrophysics and space physics
CoSka	Cont. Astron. Obs. Skalnaté Pleso
CR2..	Comptes Rendus Acad. Sci. Ser. II
EL...	Europhysics Letters
EM&P.	Earth, Moon, and Planets
FCPh.	Fundamentals of Cosmic Physics
FoPh.	Foundations of Physics
Gemin	GEMINI Newsletter (RGO)

Table 24-2: Journals scanned for SIMBAD bibliography. A full up-to-date list is available on-line via WWW [→2]

REF. CODE	Title
GriO.	Griffith Obs.
IAUC.	IAU Circular
IBVS.	IAU Inform. Bull. Variable Stars
Icar.	Icarus
IrAJ.	Irish Astron. J.
ISKZ.	investigations of the Sun and Red Stars
IzKry	Izv. Krym. Astrofiz. Obs.
JApA.	Journal of Astrophysics and Astronomy
JAF..	J. Astronomes Francais
JAVSO	J. American Assoc. Variable Star Obs.
JBAA.	J. British Astron. ASS.
JBIS.	J. British interplanetary Society
JHA..	Journal for the History of Astronomy
JRASC	J. Royal Astron. Soc. Canada
KFNT.	Kinematika Fizika Nebesnykh Tel. (Kiev)
KoIs.	Kosmic. Issl. (Cosmic research)
LAstr	L'Astronomie
Mercur	Mercury
Msngr	The Messenger
MitAG	Mitt. Astron. Gesellschaft
MitVS	Mitt. Verand. Sterne
MNRAS	Mon. Not. Royal Astron. Soc.
MNSSA	Mon. Not. Astron. Soc. South Africa
MmSAI	Mere. Soc. Astron. Ital.
Natur	Nature
NewSc	New Scientist
Obs. .	The Observatory
PASAU	Proc. Astron. Soc. Australia
PASJ.	Publ. Astron. Soc. Japan
PASP.	Publ. Astron. Soc. Pacific
PAZh.	Pis'ma Astron. Zh.
PBeiO	Publ. Beijing Astron. obs.
PhR..	Physics Reports
PhRvA	Physical Review A
PhRvD	Physical Review D
PhRvL	Physical Review Letters
PhS..	Physica Scripta

Table 24-2: Journals scanned for SIMBAD bibliography -- cont.

<u>REF_CODE</u>	<u>Title</u>
PhT..	Physics Today
PNAOJ	Publ. Nat. Astron. Obs. Japan
POBeo	Publ. Obs. Astron. Beograd
PPMtO	Publ. Purple Mountain Obs.
P&SS.	Planetary and Space Sciences
PTRSL	Philosophical Transactions R. Soc. London
PZ...	Peremennye Zvezdy (variable stars)
QJRAS	Quart. J. Royal Astron. Soc.
Rech.	LaRecherche
RMxAA	Rev. Mexicana Astron. Astrofis.
RoAJ.	Romanian Astronomical Journal
RPPh.	Reports on Progress in Physics
RvPD.	Revue du Palais de la Découverte
SAADC	South African Astron. Obs. Circ.
SoByu	Soobshch. Byurakan Obs.
Sci. .	Science
SciAm	Scientific American
SciN.	Science News
SSRev	Space Science Reviews
S&T..	Sky & Telescope
S&W..	Sterne und Weltraum
VA. .	Vistas in Astronomy

Table 24-2: Journals scanned for SIMBAD bibliography - end.

REF. CODE	Title
A& R..	Ast <b>Km.</b> Raumfahrt
AAfz.	Astrometria Astrofizika
AdAAp	Advances in Astronomy and Astrophysics
AExpr	Astron. Express
AISAO	Astrofizik. Issledovanija, Special Astrophys. Obs.
AnAp.	Ann. Astrophys.
AnCap	Annals Cape Obs.
AnTok	Ann. Tokyo Astron. Obs.
ArA. .	Arkiv for Astron.
ARA&A	Annual Review of Astronomy and Astrophysics
BAICz	Bull. Astron. int. Czech.
BAN..	Bull. Astron.Inst. Netherlands
BANS.	Bulletin of the Astronomical institutes of the Netherlands, Supplement Series
BITon	Bol. inst. Tonantzintla
BOTT.	Bol. Obs. Tonantzintla Tacub.
CAF0E	Circulaire de l'Association Francaise d'Observateurs d'Etoiles Variables
CiBAA	Circular of the British Astronomical Association
CoAsi	Contr. Asiago
CR. . .	C. I. Acad. Sci.
CRA..	C. I. Acad. Sci. Ser. A
CRB..	C. I. Acad. Sci. Ser. B
ESOSP	European Southern observatory - Scientific Preprints
IAUCo	IAU Colloquium
IAUS.	1 AU Symposium
IAUT.	IAU Transactions
NPhS.	Nature, Physical Science
Orion	Orion
PhRvB	Physical Review B
PhRvC	Physical Review C
Stern	Die Sterne
Urani	Urania

Table 24.3: Some Additional Acronyms. A full list is kept on-line and available via WWW [->1] and [->2]

REF. CODE	Title
1960 CGCG..C01...02.	Zwicky, Herzog, and Wild. 1960, CGCG Vol I
1963CGCG..C02...0Z	Zwicky and Herzog. 1963, CGCC Vol II
1966CGCG..C03...0Z	Zwicky and Herzog. 1966, CGCG Vol III
1968CGCG..C04...0Z	Zwicky and Herzog. 1968, CGCG Vol IV
1965CGCG..C05...0Z	Zwicky, Karpowicz, and Kowal. 1965, CGCG Vol V
1968CGCG..C06...0Z	Zwicky and Kowal. 1968, CGCC Vol VI
1982ESO...C.....0L	Lauberts. 1982, ESO/Uppsala Survey
1989ESOLV.C...01.	Lauberts and Valentijn. 1989, ESO-LV Photometry
1962MCG...C01...0V	Vorontsov-Velyaminov and Krasnogorskaja. 1962, MCG Part I
1964MCG...C02...0V	Vorontsov-Velyaminov and Arhipova. 1964, MCG Part II
1963MCG...C03...0V	Vorontsov-Velyaminov and Arhipova. 1963, MCG Part III
1968MCG...C04...0V	Vorontsov-Velyaminov and Arhipova. 1968, MCG Part IV
1974MCG...C05...0V	Vorontsov-Velyaminov and Arhipova. 1974, MCG Part V
1971CGPG.....0Z	Zwicky. 1971, Selected Compact and Post-Eruptive Galaxies
1973UGC...C.....0N	Nilson. 1973, UGC
1974UGCA..C.....0N	Nilson. 1974, Selected Non-UGC Galaxies
1976RC2...C.....0d	de Vaucouleurs, de Vaucouleurs, and Corwin. 1976, RC2
1991RC3...C.....0d	de Vaucouleurs, <i>et al.</i> 1991, RC3
1981RSA.....0S	Sandage and Tammann. 1981, Revised Shapley-Ames
1983RVG...C...0P	Palumbo et al. 1983, Radial Velocity Catalog
1985Q&AN2.C.....0V	Veron-C. and Veron. 1985, Quasars Active Nuclei, 2nd ed
1985SGC...C...0C	Corwin, de Vaucouleurs, and de Vaucouleurs. 1985, Southern Galaxy Catalog
1959VV...C.....0V	Vorontsov-Velyaminov. 1959, interacting Galaxies

Table 24-4: Reference Codes for Selected Catalogs

REF.-CODE	Title
CIT.	California Institute of Technology (U.S.A.)
CornU	Cornell University (U. S. A.)
UCSD.	University of California, San Diego (U.S.A.)
UEdin	University of Edinburgh (United Kingdom)
UPari	University of Paris (France)
UTole	University of Toledo (U. S. A.)
UToro	University of Toronto (Canada)
YeshU	Yeshiva University (Russia)

Table 24-5: Examples of University Codes